Modern Agricultural Production Systems and their Economic Effects

An Honors Thesis (HONRS 499)

By

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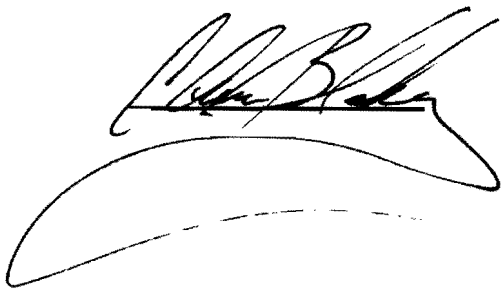

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ABSTRACT

Industrial agricultural practices have become increasingly popular in recent years. Their promise to restart stagnant, rural economies proves alluring to many individuals. However, spurred by the development of Concentrated Animal Feeding Operations (CAFOs), an increasing number of individuals are now reexamining these production methods that have radically altered America's production of food. Grappling with these issues is having a polarizing effect on communities. Vague language regarding agricultural production only serves to exacerbate this dilemma. Clarity of terminology must be established in order to effectively communicate about these issues. Further, a critical evaluation of the economic and environmental impacts of industrial agriculture is needed. An evaluation of peer-reviewed literature, government publications, as well as personal interviews was used to assess these impacts. The compilation of these materials into a clear framework allows the author and reader to analyze the economic impact of this type of industry. Given the information presented in this thesis, this author contends that the system currently in use in the United States is not in compliance with sustainable agricultural practices.

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Joshua Brown

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CHAPTER ONE

INTRODUCTION

Industrial agricultural practices have become increasingly popular in recent years. Their promise to restart stagnant, rural economies proves alluring to many individuals. However, spurred by the development of Concentrated Animal Feeding Operations (CAFOs), an increasing number of individuals are now reexamining these production methods that have radically altered America's production of food. Grappling with these issues is having a polarizing effect on communities. Vague language regarding agricultural production only serves to exacerbate this dilemma. Clarity of terminology must be established in order to effectively communicate about these issues. Further, a critical evaluation of the economic and environmental impacts of industrial agriculture is needed.

AGRICULTURAL SYSTEMS

There are many unique types of agricultural production methods currently in use. Each particular system is designed to solve a problem or to achieve a particular goal. Nevertheless, it is now commonplace to classify these production systems into broad, ambiguous categories. These broad classifications of agricultural production systems strip away the true complexity and nature of each distinct system. To determine the range in the variability of these production systems one must regard the stated purpose behind each system relative to the problem it seeks to solve.

Natural farming and low input production systems are both sustainable practices in agriculture, yet they both are designed differently. Low input systems, for example, rely primarily upon on farm resources in order to minimize off farm resource use (Gold). This system

reduces the use of fertilizers and pesticides while increasing both short and long term profitability by lowering production costs (Gold). Low input systems involve low capital techniques to minimize off farm resources, such as minimal tilling. Natural farming, in contrast, involves, "no tillage, no fertilizer, no pesticides, no weeding, no pruning, and remarkably little labor" (Gold). These two systems may have several similarities, and potential overlaps in practices, but it is the ethic of these two production methods that radically differentiates them.

When referencing these two methods, one can see how under a broad categorization of farming methods, both natural and low input farming would be classified together. Upon closer inspection, however, their disparity becomes apparent. Natural farming does not seek to minimize off farm resources, it seeks to farm in nature's image. Nevertheless, at times it conforms to a low input production method goal.

Also of concern is the frequency by which these broad categories are analogized. Traditional agriculture systems are commonly regarded as sustainable agriculture systems. This assumption is not always the case. A traditional agricultural system is defined by, "inventive self-reliance, experiential knowledge, and locally available resources" (Altieri). These farming practices rely on complex biological interdependencies, low input technology, local crop varieties, effective recycling, diverse species presence, and utilize a variety of microenvironments within the region (Altieri). Sustainable methods, however, are, "farming systems that are capable of maintaining their productivity and utility indefinitely" (Ikerd 18). A fundamental premise of these sustainable methods is, "resource-conserving, environmentally compatible, socially supportive, and commercially competitive" development (Ikerd 18). Meanwhile, industrial agriculture is defined to be the large-scale production of food. Frequently referred to as "factory farming," this method is seen, by many, to be an unnatural, unsustainable,

and a dangerous way to produce food (Pollan). Large-scale production does not have to be regarded in this manner. Given the definitions above, it is important to note that industrialized production systems can at times, also be sustainable systems.

A critical component of sustainable agricultural methods, according to Ikerd, is the economic viability of the agricultural operation. For a system to be sustainable, it must be able to operate within the marketplace. If it is unable to sustain itself, how would it be able to maintain its, "productivity and utility indefinitely" (Ikerd 18)? In short, economic viability is critical to the success and sustainability of any agricultural system, traditional or otherwise. This facet of sustainability is lacking in research sources, yet is a key component to the feasibility of any agricultural system.

Broad categorizations, common in inarticulate discussions of agricultural policy, this author argues, lead to misinformation and generalizations that erode society's ability to make intelligent decisions about agricultural production systems and their use. Exacting terminology and a thorough knowledge of sustainable techniques and technology is critical to the accurate assessment and planning of agricultural systems.

Modern Agricultural Systems

Residents are attempting to discover what agricultural production methods are appropriate for their diverse communities. They are seeking detailed knowledge of sound, ethical production methods. Each possible solution is currently under intense political, cultural, economic, and environmental scrutiny. Therefore, as a consequence of these efforts, an examination of contemporary agricultural perspectives and practices is underway.

Contrasting agricultural perspectives are unlikely to be resolved soon, however each perspective demands an in-depth inquiry into our nation's agricultural policy. Michael Pollan, an

author of several best selling books on industrialized agriculture, provides discourse on the cultural opposition of the industrialization of agricultural practices in America. In Pollan's article, "Our Decrepit Food Factories," a framework is presented that seems to favor the complete reworking of the agricultural system in America (Pollan). He claims that Concentrated Animal Feeding Operations (CAFOs), a type of industrialized agriculture, as well as many other agricultural entities "rearrange natural systems along the lines of a machine," and "offend the rules of nature" (Pollan). This industrialized system, he claims, is unnatural and unsustainable (Pollan). Unfortunately, while he is severely troubled by this industrialization in his New York Times article, he offers no solution to help transition America's agriculture toward a more sustainable existence.

A contrasting view proffered by Erik Lichtenberg, in his article, "Some Hard Truths About Agriculture and the Environment," contends that agriculture itself is, "inherently unnatural" (Lichtenberg 26). According to this framework, both industrial and traditional production systems would "offend the rules of nature" (Pollan). All types of agriculture, Lichtenberg claims, are intrinsically composed of restraining the natural development of animal and plant life by allowing the farmer to provide for their needs. This enlightening point of view helps to focus debate regarding appropriate agriculture methods by acknowledging the synthetic nature of all farming, traditional or otherwise.

Indiana is not immune to the rapid growth of "factory farming" that Pollan references. According to Michael Thompson of INcontext, 163,600 animals were being housed in Confined Feeding Operations (CFOs) in Indiana in 2007 (Thompson 4). Less than two decades earlier, in 1990, according to Thompson, only 5,500 were being housed (4). This radical shift is troubling to the opponents of an industrialized system because they fear the repercussions of this type of

production model. Pollan discusses the consequences to this "unnatural" production system in the above-mentioned article wherein he refers to examples such as "Colony Collapse Disorder" (with the lowering population of honey bees) and drug-resistant staph as potential outcomes. He concludes by asserting, "the question is not whether systems this brittle will break down, but when and how" (Pollan).

The true range of complexity involved in the discourse on modern agricultural production systems is not fully captured by the popular opposing viewpoints presented above. However, much remains at stake. Fair-minded solutions must incorporate sustainable systems that are conscious of the economic, environmental, political, and cultural intricacies that resonate through American society. These solutions are needed to elicit an intelligent, compelling discourse on contemporary agricultural methods.

CHAPTER TWO

Economic Impacts of Industrial Agriculture

A critical component to the development of industrial agriculture involves the perceived positive economic impact. There are many complicated features related to this topic. In Indiana, a common example of industrialized agriculture is the presence of Confined Feeding Operations (CFOs) and Concentrated Animal Feeding Operations (CAFOs). Many questions spring to mind when considering these complex systems. Is there proof to demonstrate a diminution of property value after the establishment of a CFO/CAFO? Are there externalities whose costs are not being fully calculated? If so, industrial development may not be as efficient, nor as economically profound. Further, what impact does this particular type of industrial development have on the agricultural workforce in Indiana? To evaluate the overall economic impact of these types of operations in Indiana, one must consider the effect on property values, labor markets, and other economic indicators.

Property Value

Land value is a function of what the market dictates is an appropriate amount, given the unique characteristics of the property. These characteristics can include the proximity to natural resources, municipal resources, as well as the topography of the property and surrounding areas. Property value is a keen determinate by which researchers are able to evaluate the impact of CFOs/CAFOs on nearby land. By comparing land values preceding and after the establishment of CFOs/CAFOs, researchers are able to draw conclusions regarding the typical effects of these types of operations on their communities.

Surrounding areas can play a particularly critical role in the value realized from property. John Kilpatrick, in his article, "Concentrated Animal Feeding Operations and Proximate Property Values," cites a variety of case studies to determine if property devaluation exists (and to what degree) due to the presence of a Concentrated Animal Feeding Operation nearby. In his conclusions, Kilpatrick asserts that while the presence of a CAFO has a diminutive effect on nearby property, the actual effect varies and is determined by the "degree of impact" (Kilpatrick 306). The "degree of impact" is formed based upon seven value determinates (See Table) (Kilpatrick 306).

Table of Seven Value Determinates (Kilpatrick 306)

- *Type of Subject Property*
- *Physical Manifestations (e.g. air quality, insects)*
- *Impacts on Property Use (e.g. habitability, rental income or vacancy)*
- *Impact on Highest & Best Use*
- *Distance to the CAFO*
- *Engineering/Scientific Testing Performed (Air Quality)*
- *Marketability Evidence (e.g. time on market of comparable properties)*

Kilpatrick's findings suggest that effective land-use planning would allow for the negative economic impacts relating to the diminution of property value to be controlled appropriately. By restricting certain types of development in specified zones, county planners would be able to minimize property loss associated with CAFOs//CFOs. This thoughtful planning would prevent conflicted property use relative to the intrinsic nature of a nearby Concentrated Animal Feeding Operation.

Clark County, Illinois has implemented a framework that seems to reinforce Kilpatrick's assertions. The Office of the Illinois Supervisor of Assessments announced that property tax assessments would be lowered when a residence is within one and one-half miles of a hog production facility (Weida 6). The highest property tax abatement available would be a thirty percent reduction within a half-mile distance from the facility (Weida 6). Kilpatrick estimates the actual diminishment of residential property value from CAFOs can range from fifty to ninety percent (Kilpatrick 306). The political action in Clark County, through tax abatements, attempts to formally recognize the impact that many of these industrialized facilities has on its neighbors.

In conclusion, it is indisputable that the detrimental effects on property values within one mile, given the available data, occur frequently. Fortunately, these impacts can be managed. Through proper land use planning, rural communities will be better able to direct a changing and conflicted landscape brought about by the increasing number of industrialized farms (Thompson 4). In the short run, property tax abatements, like the abatement in Clark County, are an effective measure to reduce the impact of a CAFO, and help to counteract some devaluation that has occurred. However, in the long run, a more comprehensive strategy must be implemented by county planners to reduce these conflicted land uses.

Labor Markets and Other Economic Indicators

Concentrated Animal Feeding Operations have a profound effect upon the labor force of America, in addition to an effect on property values as described above. Their widespread presence helps to form a formidable impact in the labor market. Do occupations in industrial agriculture pay well? Further, how does this new labor force impact its community?

Many critics of industrial agriculture claim that jobs in meat manufacturing are not beneficial to the local economy (Cox). These individuals argue that the employer should provide

more benefits and higher pay (Schlosser 175). Some of these claims seem to have merit. According to Manns, meat manufacturing is the largest demander of labor in food production nationwide (Manns 8). While plentiful, on average these jobs are also the lowest paid in the food manufacture industry both in Indiana, and elsewhere across the United States (9). In 2004, the average salary for all jobs associated with the Indiana pork industry was $33,700 (Mayen and McNamara). Meanwhile, the median income in 2004 in Indiana was $43,003, according to the U.S. Census Bureau (U.S. Census Bureau). In addition, according to Roman Keeney, an Agricultural Economist at Purdue University, over two-thirds of the hired labor at CAFOs nationwide is comprised of immigrants (Keeney 2). While he notes that some of these immigrant laborers are of legal status, it is important to consider the benefit that the original community has realized through the operation of these establishments.

While many positions are low paying, caution and discretion must still be exercised before any alterations are implemented in the production or regulation of the agricultural industry in the United States. According to Manns, the food manufacturing industry supplies 1.5 million jobs in the United States (Manns 8). Approximately one-third of these jobs are in the meat production industry (8). Further, jobs related to farms and farm related businesses comprise 15% of the jobs in Indiana (pop. 6,376,792), according to Indiana's Strategic Plan (Indiana State Department of Agriculture 2) ("Public data"). If a workforce of this size was displaced it would severely impact the current and future economic growth of Indiana and the United States. This impact will only increase if trends continue to develop. Indiana's Strategic Plan notes that the America livestock sector has increased from $20 billion in 1960 to $122 billion in 2004 (Indiana State Department of Agriculture 9). The four largest livestock sectors in Indiana alone have an economic impact of nearly $6 billion and create jobs in excess of 35,000 (Mayen and

McNamara). These results seem to mirror those found in other places as well. Dr. Steve Deller claims that agriculture "contributes $16.8 billion to Wisconsin's economy" (Deller).

Industrial agriculture's impact on labor and aggregate economic conditions, in this author's opinion, is an important factor concerning the development of this industry. While wages for this sector may be lower than many other industries, these wages are simply a function of market conditions.

The positive economic impacts of industrial agriculture in Indiana, and across the United States, helps to decrease any effect that a devaluation in property has realized through the development of this industry. Nevertheless, perseverance to institute effective legislation is imperative at this political impasse. Positive economic benefits related to labor and other economic indicators in some areas must not be sacrificed for the environmental destruction and economic dislocation of properties adjoining these industrial facilities. A balance must still be found.

CHAPTER THREE

INTERVIEWS

Conducting an intensive literature review is only able to uncover a fraction of the information available regarding industrial agriculture, and more specifically, Concentrated Animal Feeding Operations (CAFOs). Informed citizens and industry-insiders all possess a multitude of information that has yet to be recorded. These unique insights are no less relevant to the debate on industrial agriculture as the viewpoint of a learned doctor. These perspectives, however, must be balanced. Rumor, and seemingly commonsense conclusions found in these discussions, at times, can lead to greater misinformation and conflict with confirmed scientific conclusions. These individuals possess exclusive knowledge, based on a rich upbringing and first-hand experience allowing them to educate others. Their depth of experiential knowledge is not based on their formal education, nor based upon peer-reviewed publications, but developed as a result of a lifetime of direct involvement in the agricultural industry.

Tom Richards follows his family's lengthy legacy. As an eighth generation farmer, he acknowledges that his family's farming practices, like those of many families across the nation, have changed dramatically with time. In this author's interview, he compares the shift to a more industrialized farming method to the industrialization of manufacturing that has already occurred in the cities. Automobile manufacturers, he argues, have made a shift in practices that is similar to the one currently ongoing in agriculture (Richards).

Mr. Richards does not complicate issues of agricultural policy. From his point of view, agricultural goods are, "just a commodity like anything else," (Richards). Making frequent

references to the industrialization of the transportation industry he analogizes their effect on society. These commodities, mechanical and biological alike, he argues, both respond to consumer demand. Any necessary change in the market, using this framework, would need to originate with the demand for the product. In short, if changes in the production style were demanded, they would be enacted.

Some things, however, are difficult for consumers to pinpoint. Consumers have difficulty researching which companies have records of polluting the environment haphazardly and illegally. Further, when these investigations are conducted, it is difficult to inform and convince society of these conditions. Finally, those who are apathetic or who are not directly affected by these abuses may be unwilling to refrain from purchasing these goods, regardless of the company's environmental record. This is where governmental intercession could be most influential.

When discussing the environmental consequences of industrial agriculture, Mr. Richards cites the numerous governmental regulations that have been sanctioned to protect the environment from violation. "There is regulations out here for everything: factories, automobiles, farming" (Richards). He, again, draws parallels to other types of industrialization. He references the manufacture of automobiles as well, "There's issues with the city and producing cars, you've got smoke stacks in the air... but they have to meet regulations as well" (Richards).

Brian Bergan has been the director of Agribusiness and Economic Development at Eastern Indiana Development District for four years. When discussing Concentrated Animal Feeding Operations, a framework he has supported, he acknowledges, "I don't think any system is perfect" (Bergan). He argues, though, that this system has helped to control the environmental impact of agriculture, and simultaneously has had a, "huge economic impact" (Bergan). Mr.

Bergan argues that these CAFOs have been able to effectively handle the waste products in a way that is not harmful to the environment. They serve as nutrients to crops and are only applied, "under conditions that are controlled" (Bergan).

He further asserts that technological advances in energy production now allow a Concentrated Animal Feeding Operation to process manure into "electricity, steam, or a natural gas product" (Bergan). This advance has extensive consequences for waste handling, energy production, and environmental contamination risk. Less environmental risk would be realized by CAFOs if they were to eliminate or reduce the use of lagoons. These advances may make this goal possible.

Many critics of confinement operations claim that the absence of natural surroundings, the presence of concrete flooring, and the multitude of other animals in a concentrated area, cause unnecessary stress on the animal (Cox). Mr. Bergan contends, "if an animal is not comfortable or is under stress, it won't grow, or a stressed cow will not produce the maximum amount of milk" (Bergan). This framework stipulates that the farmer has an incentive to reduce unnecessary stress on their animals. After all, this stress hinders their profitability. A conscious, rational farmer would ensure that their animals are well taken care of.

He gives an example of the benefit to these confinement operations as well:

> Dairy cattle are really kind of a fragile cow they have a very thin hide. They don't take well to weather. If you took your clothes off and stayed outside 365 days a year... Now, I will feed you and give you all the water that you need. How comfortable would you be? Standing in the blazing sun, standing in the bitter cold and rain. It's the same for a dairy cow. They don't like being out in the elements anymore than you do (Bergan).

During a special meeting with Barbara Cox and Julie Alexander, a variety of perspectives were presented. This diverse offering allowed the attendees to gain in depth knowledge and a unique point of view. Julie Alexander, a retired educator, and recipient of the Frontline Advocate of the Year Award, from the Hoosier Environmental Council, discussed problems that the establishment of CAFOs can pose to community schools (Slabaugh). She claims that the presence of an immigrant's family can at times have a profound effect on local schools. As was mentioned earlier, many laborers at Concentrated Animal Feeding Operations are not natives of the United States, and have little or no knowledge of English (Keeney 2). While federal grants are available to help schools provide adequate resources to these students, Mrs. Alexander claims that this process can be timely. These increased demands on schools, she claims, are costs not typically associated with the development of Concentrated Animal Feeding Operations, yet should be taken into consideration when computing the economic benefit that these operations generate.

Barbara Cox, a retired nurse, who now spends much of her free time lobbying for changing regulations concerning Concentrated Animal Feeding Operations, discussed the role of IDEM in enforcing environmental regulations. Mrs. Cox states, simply, "IDEM is terrible." She claims that they do not effectively follow their own guidelines for environmental compliance. She asserted that if these large confinement operations were located in proper locations and managed appropriately, this system could be effective. She argues, however, that the current management of these operations is not at an appropriate level. Currently, she claims, many citizens are being negatively impacted by operations that do not comply with federal and state environmental guidelines.

CHAPTER FOUR

DISCUSSION & CONCLUSIONS

There are two primary opposing perspectives with regards to the establishment and further development of industrial agriculture. First, some individuals, uncomfortable with this type of development, are concerned about the negative ecological and property value effect that this system will have. Secondly, other individuals are focusing upon the economic gains that can be realized through this type of large-scale model. By carefully reviewing the literature and interviews presented in this thesis, it is clear that the further development and implementation of this type of agriculture is a complex issue that is comprised of many tensions, interests, and varying data. The abolition of this production model, as many opponents argue, is not realistic, nor is it appropriate. Destructive terminology, like that evidenced in, "Our Decrepit Food Factories," does not assist in the resolution of competing agricultural production systems. Instead, these articles create a barrier between individuals and assist in creating resentment, not solutions. Additionally, solely focusing upon short-term economic gains is not a responsible, nor is it an effective solution for long-term growth. These two competing ideas must be resolved.

To achieve this goal, the government must effectively enforce current regulations regarding the practices of these industrialized agricultural firms. This enforcement includes environmental and immigration based regulations. Ignorance of law by businesses and government itself is unacceptable. When legal statues are disregarded, the integrity of the law is compromised. When discussing the responsibilities of Concentrated Animal Feeding Operations,

it is important to remember the intent of a business. A business is formed to create profits. It remains in business to increase its profits (Friedman). While operating within the law and an ethical construct, a business, Friedman argues, must "make as much money as possible while conforming to the basic rules of society" (Friedman). If these rules are disregarded by an industry, it is the government's responsibility to see that this sector is appropriately sanctioned.

In conclusion, the United States agricultural production system must conform to sustainable methods. These systems must be, "resource-conserving, environmentally compatible, socially supportive, and commercially competitive" (Ikerd 18). Is the current agricultural system conforming to sustainable methods? This author contends that the system currently in use in the United States is not in compliance with modern sustainable agricultural practices. Given the information presented in this thesis, this model of agriculture will be better able to fully deliver on this promise through the further refinement and the development of efficient on-site electrical power production, responsible livestock production capabilities, and environmentally sound management approaches. However, only with the mindful adherence by both businesses and governmental regulators to their roles, can this system continually develop towards a more sustainable framework.

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APPENDICES

Transcripts of Personal Interviews

Appendix A

Transcript of Interview with Brian Bergan

on February 28, 2009 at

Eastern Indiana Development District, New Castle, IN

Appendix B

Transcript of Interview with Tom Richards

on April 11, 2009 at

his home, Matthews, IN

APPENDIX A

Transcript of Interview with Brian Bergan
on February 28, 2009 at
Eastern Indiana Development District, New Castle, IN

Joshua Brown (J): What is your name and title?

Brian Bergan (B): My name is Brian Bergan, and I am the director of Agribusiness and Economic Development

J: At Eastern Indiana…

B: Development District. We are a formally recognized planning organization. We consist of six counties in East Central Indiana.

J: I just do want to say – do I have your permission to record the audio: just so I can use it for transcripts, it's not going to be altered.

B: Yes.

J: So how does your position as the director of Agriculture, or your experience in your own personal life give you an in-depth insight into Concentrated Animal Feeding Operations?

B: My background, professionally, err- my education is in business and in economics, so I do have an economics degree. My practical experience in agriculture is: I have spent a lifetime in agriculture. Actually production agriculture, raising animals, and owning farming operations myself. So that is basically where my experience from that comes from. As far as knowing about CAFOs and those types of things. I do a great deal of research. I work with Agricultural Universities like Purdue, University of Wisconsin, to get our data on this.

J: How long have you been director?

B: Four Years.

J: Four Years?

B: Yes, I have been in this position since 2005.

J: Ok. So we started to go into it, and then I cut it off so that we could get it on audio – but what do you think are the benefits to a Concentrated Animal Feeding Operation?

B: The very first benefit, really from the CAFOS, actually is the environmental. CAFOs, contrary to popular belief, have a very minimal impact on the environment by concentrating the animals and containing the excrement from the animals into one location. Those locations are monitored very specifically by the EPA or by IDEM. The standards are set very high so that there is no environmental impact – it cannot – CAFOs are a zero discharge facility they are not allowed to discharge anything in to the environment. If there is a hint of discharge then they are shut down. If animals are free range, obviously, they are pooping on the ground, when it rains it washes away into the environment and into the streams. With a CAFO that is not the case. When the manure is allowed from a CAFO, it is applied under conditions that are controlled and under conditions where the manure is actually knifed into the ground so that it cannot runoff into the environment. So that is the first impact. Secondly, they have a huge economic impact. It is much more economically feasible to concentrate animals in one location and use one water source, one area or space, and it cuts down on traffic on the roads, whereas if you had several small operations you are going have more feed trucks coming into more locations than one just one.

J: So, the environmental benefit, that you had said, the concentrating waste products into one area, I can see that could potentially be beneficial to the surrounding area, you don't believe though that this might be considered perhaps a "sacrifice zone" or –

B: Part of the issue that we have in Indiana is that we have very poor land use and planning. For example in Henry County or Rush County we have allowed residential housing to be built just wherever – whether it be near industrial zones whether it be in ag zones, or in areas where there are no public utilities. Actually, the housing and septic systems are more of a threat to the groundwater system than a CAFO. They discharge into the environment. They are not regulated they are not checked on a regular basis, so if you have CAFOs in an area that is for agriculture, then no, there is no sacrifice.

J: Then also, with concentrating waste products – I know that sometimes there are lagoons; sometimes there are other things. What do you feel is the best way of handling the waste products and how is it normally done in Indiana?

B: Sure. The waste products – um – depends on the species. Typically with large dairies lagoons are used because they have a larger volume of waste. Lagoons either have to be clay lined, or if the ground is not suitable for a clay lining for anything that will not allow it to leach into the soil then it must be synthetically lined. So either of those two disallow leaching into the soil. And Lagoons are tested for leaching they have peripheral drains around them to test the water so make sure they are not leaking. With dairies you have lagoons. With hogs their manure is concentrated underneath the building in which they are living. Those also have peripheral drains where they are monitored for leaking.

J: So with the lagoons are we just sealing them up afterwards... or is it kind of like a dump – or is it being used for something else later?

B: Oh, it is absolutely used for something else. For um, crop nutrient later. Typically lagoons will get a seal or a crust on them that contains everything under them.

J: Temporarily until they can use them or other things

B: Yes. There are also other methods out there where you can actually put a tarp over top the lagoon to catch the methane gas. So there are a couple different methods for that. But usually in the spring or the fall when conditions allow, they use the manure for crop nutrient. So you are using an organic material for crop nutrient versus what is typically used which is a petroleum-based fertilizer

J: So then, those are your benefits of a Concentrated Animal Feeding Operation. Are there any drawbacks to this system, and if so what are they?

B: Well, I don't think any system is perfect. I think that we can continually improve systems. The buildings that are being built now, particularly for dairy and swine, versus what was built in the late 70s and 80s are worlds apart in difference in air quality, in systems management, disease management, animal comfort, they are continually striving and doing studies to make sure animals have the proper amount of comfort. One thing that is very difficult for people to understand is that if an animal is not comfortable or is under stress it wont grow, or a stressed cow will not produce the maximum amount of milk. So the buildings that are built today are directed specifically towards cow behavior or hog behavior so that it maximizes their comfort. I know that sounds strange to a lot of people. I gave a lady an example, particularly with dairy cattle, because they are kept inside. Dairy cattle are really kind of a fragile cow they have a very thin hide. They don't take well to weather. If you took your clothes off and stayed outside 365 days a year. Now, I will feed you and give you all the water that you need. How comfortable would you be?

Standing in the blazing sun, standing in the bitter cold and rain. It's the same for a dairy cow. They don't like being out in the elements anymore than you do.

J: So then for the drawbacks, you would kind of just think that further development in increasing the conditions that the animals are kept in. I know you mentioned air quality as well do you think that that could be worked with further in the future to help improve that?

B: Actually, I think that we are at a point now where it is very good. I think in the past that there were some issues. But, the buildings that I have been into now are remarkable. The air quality in many swine buildings is better than going into a nursing home.

J: So you feel like many of the major drawbacks of Concentrated Animal Feeding Operations have already been addressed in the past and now, you believe that modern facilities are better able to equipped to handle these things.

B; Correct. Now I will say that Indiana, because of the way we regulate CAFOs, is in a far better position, environmentally, than other states that I have seen. I have been to Colorado, California, Iowa, and looked at facilities, now their modern, their brand new facilities are great, but some of their older ones were – I felt, had an environmental impact. In Indiana, we have regulated more strictly. And have controlled manure applications and controlled how you contained manure more strictly to protect groundwater systems. So we have had far less environmental impact than other states. During the floods that we had this past year, not one CAFO was compromised. So I think that's a good testament that we are going a good job of citing and locating these facilities.

J: So, you listed as one of the benefits of a CAFO (Concentrated Animal Feeding Operations) you listed that one of the benefits are the economy. Do you believe that the economic

impact of CAFOs is felt very profoundly in the local economies as well, and if so, maybe an example of a CAFO helping to rejuvenate some sort of local economy.

B: Yes. Actually in the rural economy, particularly rural Indiana, animal agriculture has an enormous impact. In the six counties EIDD since 2005 we have had about $500 million invested in agriculture. A large portion of that was animal agriculture. As an example of a retention project we had two feed mills that were slated to close. That would have been a loss of about 40 to 50 jobs. Both of those, because of the hog industry moving into eastern Indiana, or increasing in Eastern Indiana, were saved. One is still privately owned and has contracted with a large swine company; the second is purchased by a large swine company. The impact of dairies is even more significant. They will employ one person for every 75 cows that they have. The average wage on a dairy in Indiana is about $12.85/hour, for hourly help, plus benefits, usually. One dairy cow adds about $17,000 a year in economic impact based on her care the work required to get the milk, to transport it, and to process. So they do have a very significant impact in rural Indiana.

J: Also, you were talking about how CAFOs were a zero discharge entity and how they were very strongly regulated by IDEM, but accidents do happen sometimes with any industry, and some things do happen. While it is pretty clear that you do not believe that CAFOs degrade the environment, do you believe that when there is some sort of leakage or some sort of degradation of the environment that is acceptable for when it happens?

B: I don't think it's ever acceptable anytime you have an accident. It doesn't matter if it's a load of manure being spilled or a train car of sulfuric acid in an accident. I don't think that we can completely minimize risk. However, when I look at those in similarity, I would much rather have a load of manure dumped on the highway and spill into the creek than I

would a load of sulfuric acid, or oil, or diesel, or whatever. Either one is going to cause an issue with environmental impact. However manure is a natural product and it's going to dissipate into the environment much quicker than some chemical. But I think we do a pretty good job. But I think we could always do a little bit better.

J: But looking at it from Cost Benefit Analysis, you believe that any of the environmental costs are far exceeded by the benefits that CAFOS are able to give?

B: Oh yeah. I truly believe that the benefit of having the manure from a CAFO applied to a field is not only more economical, but far better for the environment than chemical fertilizer.

J: So do you believe that Concentrated Animal Feeding Operations are a sustainable way to produce food? I am not sure if you are familiar with Michael Pollan, but he wrote an Eaters Manifesto, and In Defense of Food, is his most recent book, I believe. In an op-ed piece he wrote for the New York Times he said that this new age buzz word is "sustainability" but no one really thinks about what it means, and he was talking about CAFOs and he asserted in his article that they were just simply not sustainable. Do you disagree with Michael Pollan, and if so, why or how?

B: Well, I have not read any of his work and I don't exactly know he is defining sustainability, but I will say from my viewpoint if we are going to produce protein for the food market, at a reasonable price, then yes, the way that we are producing it with large animal operations is sustainable. The world's population is growing; the world's demand for meat proteins is growing. As we see in India, as the economy is growing larger, and people have more money, they want meat. The Chinese market now can afford meat protein. As that grows, we really have to look out how we are going to feed a hungry world, and feed it economically. I think that there is room for both. What some people

call "sustainable" agriculture, where agricultural animals run loose, out in nature, I think that as long as they are in a proper location where they are having minimal impact, that's fine. But you also notice that when you are having those types of operations, and some of them are organic, the price of that food is 2 to 3 times the amount of food coming from larger operations. Plus, their loss is greater, and the loss of larger operations is smaller, because the animals are in a more controlled environment. So I believe that large operations will continue to be built, I believe that they are sustainable, economically, and I believe that they will still produce the food that we need safely and more cheaply.

J: You said that CAFOs were sustainable economically, but do you also believe that they would be sustainable environmentally because what he had talked about was that housing this many number of animals in one area, he claimed, was having... I mean - you help to decrease a lot of inefficiencies economically, travel, transport, that sort of stuff you can centralize and specialize in the production, which is important, but Michael Pollan was talking about was saying that this gross amount of animals, in one specific area wasn't a sustainable way that could not be continued three hundred years from now, let's say, if Al Gore is wrong, three hundred years from now, and still would not degrade the environment, three hundred years from now we would still be able to continue the practices that we are ... practicing today.

B: As far as swine is concerned, if you read Systemia of Agriculture, was written about 1675 or so, they have actually discovered even in the 1600s that confining hogs made a better hog, you spend less money feeding them and less time. Hogs that are allowed to run through in the wild lost too much fat searching for food, but when you took care of them, pinned them, they actually did better. For three hundred years, we know that that is the

best method for doing farms, now housing them, that has changed over the years, and the quantities, and the number people of growing them has changed over the years. Now, where like Mr. Pollan, fall down in their theory, as we look further in the future in the technology, one of the things that the agriculture industry will be producing off of these large operations is energy. The science is now there to take the waste material from these large operations, virtually making a dairy, lagoon-less. It would go right into a processing plant where it is be turned into electricity, or steam, or a natural gas product, so I think that is the area of huge growth potential, for CAFOs, making them even more environmentally friendly than they are. I think that is one area that these folks are really not looking at. The only aspect that may be correct is disease control, and that is one area that is being severely addressed by the industry and that is why they, themselves, have imposed put restrictions on how large a facility really should or could be.

J: So when you were talking about – what was the literature from 1675?

B: Systemia of Agriculture.

J: Systemia of Agriculture, basically what they were saying was, is that a successful economic condition – can bring about – well no – successful pigs, as far as good health, etc, can bring about successful economic conditions, because you are saying that the farmer has some sort of incentive to provide the best care because they can get more money? And that the pigs thrive in this sort of atmosphere?

B: Yes

J: That's what I thought. Also, you were talking about the care and treatment of the animals. I believe you said a "proper" amount of comfort, and I was curious what exactly, do you believe is the impact in many of these CAFOs, it's cement ground, it helps with clean up,

especially if they are indoors it's understandable why there is cement ground, but do you believe that the cement flooring, and their absence from nature takes away from their natural drives and health in any way?

B: Actually, that is a very interesting subject, as far as dairies are concerned, and cattle, particularly being on concrete can cause some issues, and they address that in 2 ways, actually 3 ways, the cattle go through a foot bath, in and out on their way to the milking part of it every day, and this bath has stuff in it that helps their hooves and helps their feet. They also bring in people to keep their hooves trim and so that they are at a good level. Because they don't necessarily are out their chipping them away at rocks, and all that kind of stuff, naturally, so they actually bring in a pedicurist, to make sure the feet are formed properly that costs a dairy probably about $60k a year, on an average size dairy, just to bring this person in to keep their feet comfortable, because they do know that if the cow's, if their feet are not comfortable, they don't milk well. The third thing that they have addressed with that is when the cows sleep, in their sleeping area, typically they use sand beds, that are raised, so the cows in the summer time, they're cool and in the winter time, it is warm, and it is very comfortable for them. So that is the way that they have addressed keeping the cows comfortable in a concrete environment.

J: So, in conclusion, what is one thing that you wish everyone knew, one fact of CAFOs, that everyone knew, in these times, which seems be very charged perceptions, very opinionated perceptions of them, what is one thing from your perspective that you wish people knew and could take away from industrial agriculture.

B: I guess a couple of points. First, new buildings are designed for the animal needs, for a need to keep the animal comfortable, and to allow the animal to grow properly and to produce

properly. Secondly, the environmental impact of containing animals is far better than the way they used to do things, where we used to let animals fun "free" we have reduced the amount of pollution to the environment, significantly, by using Concentrated Animals Feeding Operations. The third part of it is the economic impact; these operations have a significant impact on the economies of rural states and rural counties. So they are in proper locations, they are not near cities, not near towns, and we do need to do far better at land use planning, in all forms really, not only for residential structures, but for agricultural structures as well.

J: And when you are talking about the land use, just real quick, what kind of controls do you believe would facilitate a healthier Indiana?

B: I believe that restricting rural residents would be a significant impact to the ground water system in Indiana. Septic systems are a major pollutant. The storm water separation in large cities, and large cities are dumping multi-millions of gallons of raw waste into the river systems in Indiana. I think that that needs to be controlled as well. A rural resident costs the county $1.76 dollars per every $1 of taxes it brings in, so they are... a loss. Industry and agriculture really carry the burden of keeping a county going tax wise, but I think we need to do a better planning of keeping residences near municipal systems, where the waste is controlled and processed.

J: But you don't believe that residences in restricted from living – because the first thing I thought when you said land use planning is maybe setting up a certain zone around a CAFO due to smell, or flies, that sort of stuff. That is not what you were alluding to you were alluding to the sewage and stuff like that.

B: Yeah

J: And you wouldn't believe that being within a mile or two miles of a CAFO would in many cases have a negative effect on that residential home? Because it's a zero discharge…

B: Yes

J: OK I just wanted to make sure.

B: Right, and as far as the property value argument, the Kelley School of Business has concluded a study on land values and properties adjacent to CAFOs and actually their conclusion was that their property values increase in value, not decrease in value. A similar study was conducted in Wayne County and found the same thing happening. So really, it is a negligible argument in Indiana, as far as land values go now do I think that it is proper to have rural residences in intensive agriculture zones? No. I do not. That is not what it is for. I also do not believe that residences should be in intensive industrial zones.

J: But you don't believe that their property value would be impacted if they were in a certain –

B: No.

J: I have seen the Kelley – well I haven't seen it I have heard about it – but I have also seen some other research finding the contrary. Is it possible that under some circumstances a CAFO might be beneficial, depending on the economic status of the community already, and under other cases, it may be detrimental to the economy of a local area?

B: Beneficial yes, to my knowledge, I don't know of one that has been detrimental. I am trying to think. I can't think of one that would have been. Granted, periodically you find someone that is a poor operator, and I think that we need to be more diligent in shutting those people down. If they are not following the rules, they need to be no longer in operation.

J: That would be the role of IDEM, or the EPA too?

B: Yes, and not only in agriculture, but in all things I think we need to be more diligent towards those folks who are polluting and not following the rules.

J: I have a real quick question, my last one, I'm sorry. I just remembered, actually, IDEM's enforcement department was actually closed, recently from what I have heard, under Governor Mitch Daniels, and I wasn't sure how effective IDEM would be at citing and properly enforcing these CAFOs or any bad operators, whether it be Industrial Agriculture or not.

B: The enforcement department, as far as agriculture is concerned is still operating. I am not sure which part of the enforcement – I know that it was reduced significantly, and I know that some of those jobs that were eliminated were dealing with new construction sites for run off and those types of things. The ones that are still checking CAFOs, are still working, I still see those people out in the field doing the checks.

J: So it may just be a portion of the enforcement division, not necessarily the entire department?

B: Right.

J: Ok, great. Thanks so much I really appreciate it.

B: You're welcome.

APPENDIX B

Transcript of Interview with Tom Richards
on April 11, 2009 at
his home, Matthews, IN

Joshua Brown (J): So, just so I have it on the recording, your name is Tom Richards… do you run Richard's farm?

Tom Richards (T): That's what we go by, yeah. You can see out there on the sign, I am the ninth generation – my son is the ninth generation. I am the eighth generation. He has two boys, I am not sure what their future is, but there is an opportunity here if they want to. I never pushed the fact, you know, whatever they want to do; they have to make that decision some day. But if they do, that'll be 10 generations.

J: And just so I have it as well, do I have your permission to record the audio, for transcript purposes as well?

T: Yeah.

J: So kind of the topic that I wanted to talk to you about was Concentrated Animal Feeding Operations and industrial agriculture and its place and its role in society. I have talked to people who are in favor of it, and I have talked to people who think that the current system really has some serious flaws and that there needs to be some big changes. But how does what you do and your background and your raising, affect how you view agriculture?

T: Of course agriculture has changed just like industrialization has changed. We are more high tech than we were a number of years ago. The demand for food and the ability to produce it in the most cost efficient way has led to the innovations and the changing of our type of

agriculture. The way we do things is like any business... of course there is fewer of us now. I don't know what percent we actually are as far as the amount of people that are employed and involved in agriculture, I think a few years ago, it was only 2-3% of people in the United States farm. Maybe it was higher than that, maybe that was just the state of Indiana, I don't know, but anyways. Of course the fewer the amount of people that are doing the same production that... looking back to 1947-1946, after World War II, a lot of people came back to farm, Industrialization was a big thing back in World War II and there wasn't enough to support the families on the farm, farms were smaller, and a lot of people moved to town and worked in factories and so forth. That was a booming industry at that time, of course after the war it slowed down a little bit, but then it picked back up, through automotives and things like that, but anyways, with a fewer amount of people, producing the same amount of food, of course we had to change the practices. We had to get bigger equipment, more sophisticated type, do a better job, precision type, planning and so forth, harvesting. So we had to change our way based on the demand that is out there. So we have to look at bigger tractors and bigger equipment, things that took more fuel to produce...

J: So the market is driving this change from a more traditional type of farm

T: You either had to get bigger, increase the amount of acreage that you farm would be a little more, a bigger farmer, and also you have to be productive, you have to be efficient, in that area, so farming practices have changed along with commodities that we raise also with corn, soybeans, and wheat, based in this area. You look at livestock, well, the best way they know how to produce it the amount of livestock to feed people, they have to

move to a type of system that has to raise more animals at one time. So, that's why you see a lot of more confinement type operations than what you did a number of years ago.

J: Because the demand…

T: Yeah, the demand drives the market, just like any commodity, I mean the demand for automobiles made GM and Ford and all them get bigger, spread out, and of course when the demand stops… it's what we're facing right now, it's slowed down, we're in a recession, I know we are in a recession, I don't know if about a depression yet, you never know.

J: Right, so, the benefits from just what you said, of this type of Industrial Agriculture, would be greater efficiency, greater production potentials… let's see is there any others that you can think of, I forgot to list there?

T: Not really, not only in our farming practices, but also the development of these commodities like seed corn, beans, wheat, you know, the research that has been done on that to produce a commodity that in all types of weather conditions, increasing yields, which makes production more, we are getting higher yields than what we did a few years ago. So they have done a lot of research on that though, also.

J: What do you grow yourself?

T: We grow wheat, soybeans, and corn. Percentage wise, we are probably close to half and half on corn and soybeans. We don't grow as much wheat as we used to. A lot of that has to do with economics, because it is not feasible with the prices today. With your input costs, wheat is not a really very profitable thing to raise. So we have cut back, considerably on the amount of wheat we have raised.

J: So is it just a corn, soybean rotation?

T: Yeah,

J: So is the wheat on a separate field or would that be a third rotation? Because I know that corn puts certain things in- or takes certain things out and soybeans puts certain things in, would wheat kind of work in there as well?

T: It's just a commodity like anything else. You usually follow wheat after soybeans. You usually don't recommend following wheat after wheat because of disease problems. We basically follow a corn, soybean rotation. Soybeans produce nitrogen; corn needs nitrogen because it is part of the grass family. Like your yard, you know you put nitrogen on your yard to fertilize, green it up and make it grow. But it produces nitrogen. So you usually follow a corn, soybean rotation, that way it kind of helps a little bit with the nutrients that it needs.

J: As far as potential drawbacks of industrial agriculture, or even with livestock and concentrated animal feeding operations, could you think of any that – I mean obviously the market is demanding more, so the industry is producing more --

T: --producing more with less people.

J: Right, so could you think about potential drawbacks, potential issues that –

T: Well there are some issues, one of the biggest: smell and waste. You know, there are regulations that are set before you can even put one of those type of buildings up, you have to meet your specifications. There is set up by the government, there is regulations on waste handling, and what you have to do and what you have to do to comply with that. IDEM keeps check on these confinement operations. If you don't follow the guidelines that they set, there is a fine for that. It's government regulated. So we are just doing what the laws have been set, and we are just have to follow the laws. But there are some issues,

yeah. There's issues with the city and producing cars, you've got smoke stacks in the air, but that type of pollution: air pollution. But they have to meet regulations as well.

J: So kind of the drawbacks, you think, addressing those would be the role of the government. Do you believe that the governmental interaction is about where it needs to be right now?

T: Well, somebody has to police it. Somebody has to set the guidelines and regulations. I don't see a problem. The government has to be involved in it, so I think that the guidelines is right.

J: It's on course?

T: Mhm

J: So, agriculture, concentrated animal feeding operations, a lot of people might talk about their benefit to the economy, by bringing jobs, bringing in money, utilizing the land, property taxes, what have you. Do you really believe that this can help stimulate local economies, and not just necessarily state economies or federal economies or global economies? Do you really think that there is a local impact on industrial agriculture?

T: As far as the community, of course farmers pay most, or a lot of property taxes that are set up throughout the county because of the land that we own…

J: Well, I meant as far as, for example, Smithfield, is a big name in hogs. If they were to put up a farm in Muncie, Indiana

T: You mean a processing plant?

J: And they were to raise some swine here, and process them, get them ready for shipment, do you think that that kind of establishment would benefit Muncie, IN –

T: well it would create jobs…

J: Or do you think that it would really be simply benefiting Smithfield headquarters?

T: Yeah, Well, to do that you would have to have enough production in your county or in your area, I don't think it would go much beyond a 50-80 mile radius. About the closest one that I know of right now is in Logansport, and I'm not sure who owns that now, but Tyson is involved with a couple of different people that are involved with these hog barns in a 4-5 mile distance from where I live and Tyson is involved big time with that. You think of Tyson with chicken, but they are also involved in other things too. They are pushing this.

J: So, you feel that it creates jobs, creates work, utilizes the land, and so it's beneficial.

T: And another thing too – it just not really in the question, but I think that we are a lot of times, fall short, its just the thing that people are not educated enough about, we talked about this on the phone, what goes on out here is the same as what goes on at the city, they need to be more educated instead of just throwing out the negatives, which it seems like that is what they do the best of, they need to inform the public, or not mislead the public. Let's take this for example. The price of wheat, the price of wheat took a significant jump in the commodity prices, and there is 60lb in a bushel of wheat, now it does not take – if you break that down, let's say 60lb and lets say wheat was $6, that would be .10 cents a lb, so lets say that wheat doubled in price and went to $12, which it did one time last summer. The most that the price of bread in the store would increase, if the wheat were to double is another 10 cents. What did bread do in the store? Well, went up 50 cents, 75 cents, a dollar? Now I do know that at that time, oil prices were high, and we were looking at $130 a barrel, versus $55 today, somewhere in that neighborhood, which might have added a little to the cost. I mean they talk about the price of corn effecting the food

prices in the store, but we talked on the phone, they only take 18% of a bushel of corn out in weight, and there is 56lb in a bushel of wheat. What did we figure? Do you remember?

J: I don't remember?

T: I think it was 18lb or something, So when you think of a bushel of corn going into making ethanol, that bushel is gone, therefore is not enough food here, or enough corn around, to produce what we need, but we are only using 18% I think the byproduct is, what do they call it, distilled grain, they use that for livestock to eat, so that corn is not wasted, but people don't hear that, all they hear is that we are using it for ethanol, and that there is not as much corn and they are just not educated on the matter, and what this stuff is used for. They complain that maybe we need to use other byproducts to make ethanol, I have no objection to that at all, but I think the reason they turned to corn was just because of the abundance they have of that in the country. I think that is one reason that they used ethanol, because of corn.

J: So do you think that industrial agriculture, concentrated animal feeding operations, all that sort of stuff, do you think that they have a negative impact on the environment, or do you think that they have a similar impact as smaller operations, or how would you rate that system?

T: I don't think they have a negative impact... like I said, there is regulations out here for everything, factories, automobiles, farming. There are guidelines that have to be set, and as far as I'm concerned, if we're following the guidelines. I don't see anything that is going to show a negative anything that we are doing out here. People are just being misinformed. I just think that, they can say anything they want to say in the paper, or on

TV, or their perspective view on it. But is that really the facts? Is that really putting all the cards on the table? Whether that is right or wrong...

J: So, actually you just got started on it, what is something everyone knew about this, so you kind of feel a disconnect between people

T: Yeah, I do. I don't think people are being informed they are being told what they want to know, but that's as far as it's went.